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MATHS

BOOKS - NTA MOCK TESTS

THREE DIMENSIONAL GEOMETRY TEST

Multiple Choice Questions

1. The line o intersection of the planes $r.\left(3\hat{i}-\hat{j}+\hat{j}\right)=1$ and $r.\left(\hat{i}+4\hat{j}-2\hat{k}\right)=2$ is parallel to the vector.

A. $2\hat{i} + 7\hat{j} + 13\hat{k}$

B. $-2\hat{i} - 7\hat{j} + 13\hat{k}$

C. $2\hat{i} + 7\hat{j} - 13\hat{k}$

D. $-2\hat{i} + 7\hat{j} + 13\hat{k}$

Answer: D

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2. The disance of point of intersectionof the lines

$$\frac{x-4}{1} = \frac{y+3}{-4} = \frac{z+1}{7}$$ &

$\frac{x-1}{2}=\frac{y+1}{2}=\frac{y+1}{-3}=\frac{z+10}{8}$, from (1,-4,7) is (in units)

A. $\sqrt{15}$

B. $\sqrt{27}$

C. $\sqrt{26}$

D. $\sqrt{14}$

Answer: C

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3. Plane is parallel to the vectors $\hat{i}+\hat{j}+\hat{k}$ and $2\hat{k}$, and another plane is parallel to $\hat{i}+\hat{j}$ and $\hat{i}-\hat{k}$ then the acute angle between $4\hat{i}-\hat{j}$ and the line of intersection of the two planes is

A. $\cos^{-1}\frac{1}{\sqrt{2}}$

B. $\cos^{-1}\frac{3}{\sqrt{34}}$

C. $\cos^{-1}\frac{2}{\sqrt{34}}$

D. $\cos^{-1}\frac{5}{\sqrt{34}}$

Answer: B

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4. Statement I: There will be exactly two lines making an angle 30° with $\frac{x}{3} = \frac{y}{2} = \frac{z}{1}$ and passin through (1,1,1)

Statement II: From any point outsid the line L, thee are two lines which are making an angle $\theta\left(\neq \frac{\pi}{2} \right)$

A. Both Statement I and Statement II are true and the Statement II is the correct explanation of the Statement I

B. Both Statement I and Statement II are true but Statemen II is not explanation of the Statement I

C. Statemen I is true but Statement II is false

D. Statement I is false but statement II is true

Answer: A

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5. The equation of the line passing through the points (1,-2,3) and parallel to the planes $x - y + 2z - 5 = 0$ and $3x + y + z - 6 = 0$ is

A. $\frac{x-1}{-3} = \frac{y+2}{5} = \frac{z-3}{4}$

B. $\frac{x-1}{1} = \frac{y+2}{11} = \frac{z-3}{2}$

C. $\frac{x+2}{-3} = \frac{y-3}{5} = \frac{z+3}{4}$

D. None of these

Answer: A

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6. The line $\frac{x-2}{3} = \frac{y+1}{2} = \frac{z-1}{-1}$ intersect the curve $xy = c^2, z = 0$ if c is equal to

A. $\pm\sqrt{5}$

B. ± 4

C. $\pm 1/2$

D. $\pm 1/\sqrt{3}$

Answer: A

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7. The line $\frac{x}{k} = \frac{y}{2} = \frac{z}{-12}$ makes an isosceles triangle with the planes $2x + y + 3z - 1 = 0$ & $x + 2y - 3z - 1 = 0$ then value of k is

A. 3

B. -2

C. 5

D. 0

Answer: B

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8. Given a point P(0,-1,3), the length of projection of AP, from the straight line passing through $A(1, -3, 2)$ & $(2, -1, 4)$ is

A. $\frac{5}{3}$ unit

B. $\frac{5}{2}$ unit

C. $\frac{5}{4}$ unit

D. 5 unit

Answer: A

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9. The equation of the plane through the line of intersection of the plane $ax + by + cz + d = 0$ and $\alpha x + \beta y + \gamma z + e = 0$, and perpendicular to $xy -$ plane is

A.

$$(a\gamma - c\alpha)x + (b\gamma - c\beta)y + (d\gamma - ce) = 0$$

B. $(a\gamma + c\alpha)x + (b\gamma - c\beta)y + e = 0$

C. $(a\gamma - c\alpha)x + (b\gamma - c\beta)y + d = 0$

D. None of these

Answer: A

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10. The coordinates of the foot of the perpendicular drawn from the origin to the plane $3x + 4y - 6z + 1 = 0$, is

A. $\left(\frac{3}{61}, \frac{4}{61}, \frac{6}{61}\right)$

B. $\left(\frac{-3}{61}, \frac{6}{61}, \frac{6}{61}\right)$

C. $\left(\frac{-3}{61}, \frac{6}{-61}, \frac{6}{61}\right)$

D. $\left(\frac{-3}{61}, \frac{-4}{61}, \frac{6}{61}\right)$

Answer: D

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11. If the angle θ between the line $\frac{x+1}{1} = \frac{y-1}{2} = \frac{z-2}{2}$ and the plane

$2x - y + \sqrt{\lambda} - z + 4 = 0$, is such that $\sin\theta = \frac{1}{3}$ then λ is equal to

A. $\frac{5}{3}$

B. $\frac{5}{2}$

C. $\frac{5}{4}$

D. $\frac{3}{2}$

Answer: A

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12. The volume of the tetrahedron included between the plane $3x + 4y - 5z - 60 = 0$, and the coordinate planes is

A. 500

B. 400

C. 600

D. 300

Answer: C

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13. The line $\frac{x-3}{2} = \frac{y-4}{5} = \frac{z-6}{7}$

A. lie is plane $3x + 5y + 2z = 6$

B. is parallel to $2x - 5y + 3z = 9$

C. is perpendicular to $2x - 5y + 3z = 9$

D. passing through (2,3,5)

Answer: B

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14. The direction cosies of the passing through P(2,3,-1) and the origin are

A. $\frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}, \frac{1}{\sqrt{14}}$

B. $\frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{1}{\sqrt{14}}$

C. $\frac{-2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{1}{\sqrt{14}}$

D. $\frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{-1}{\sqrt{14}}$

Answer: C

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15. The direction cosines of the normal to the plane containing both the line $x = y = z$ and $x - 1 = y - 1 = \frac{z-1}{d}$ (where $d \in R - \{1\}$) can be

A. $\left\{\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}, 0\right\}$

B. $\left\{\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right\}$

C. $\left\{0, -\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right\}$

D. $\left\{\frac{-1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right\}$

Answer: A

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16. A variable plane passes through a fixed point (a,b,c) and meets the coordinate axes in A,B,C. The locus of the point common to plane through A,B,C parallel to coordinate planes is

A. $axy + byz + czx = xyz$

B. $azy + bzx + cxy = xyz$

C. $axy + byz + czx = 2xyz$

D. None of these

Answer: B

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17. If the direction ratios of two lines are given by $l + m + n = 0, mn - 2\ln + lm = 0$, then the angle between the lines is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. 0

Answer: C

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18. If the line $\frac{x-1}{2}=\frac{y+1}{3}=\frac{z-1}{4}$ and $\frac{x-3}{1}=\frac{y-x}{2}=\frac{z}{1}$ are coplanar then k is equal to

A. $\frac{3}{2}$

B. $\frac{5}{2}$

C. $\frac{7}{2}$

D. $\frac{9}{2}$

Answer: D

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19. The reflection of the plane

$P_1 : 2x - 3y + 4z - 3 = 0$ in the plane

$P_2 : x - y + z - 3 = 0$, is the plane

A. $4x - 3y + 2z - 15 = 0$

B. $4x - 2y + z - 15 = 0$

C. $3x - 2y + 2z - 15 = 0$

D. None of these

Answer: A

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20. The xy plane divides the line joining the points (-1,3,4) and (2,-5,6)

A. Internally in the ratio 2:3

B. Externally in the ratio 2:3

C. Internally in the ratio 3:2

D. Externally in the ratio 3:2

Answer: B

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21. The image of te point P(1,3,4) in the plane $2x - y + z + 3 = 0$ is

A. $(3, 5, -2)$

B. $(-3, 5, 2)$

C. $(3, -5, 2)$

D. $(3, 5, 2)$

Answer: B

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22. The angle between the lines $\frac{x-2}{3}=\frac{y+1}{-2}=\frac{z-2}{0}$ and $\frac{x-1}{1}=\frac{2y+3}{3}=\frac{z+5}{2}$, is equal to

A. $\frac{\pi}{2}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{6}$

D. None of these

Answer: A

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23. The projections of a directed line segment on the co-ordinate axes are 12,4,3. The direction cosines of the line are

A. $\frac{12}{13}, \frac{-4}{13}, \frac{3}{13}$

B. $\frac{-12}{13}, \frac{-4}{13}, \frac{3}{13}$

C. $\frac{12}{13}, \frac{4}{13}, \frac{3}{13}$

D. None of these

Answer: C

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24. The radius (in units) of the circular section of the sphere $\left|\overrightarrow{r}\right| = 5$, by the plane $\overrightarrow{r}.\left(\hat{i}+\hat{j}+\hat{k}\right) = 3\sqrt{3}$ is equal to

A. 1

B. 2

C. 3

D. 4

Answer: D

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25. The spheres $x^2 + y^2 + z^2 = 25$ and $x^2 + y^2 + z^2 - 24x - 40y - 18z + 225 = 0$

A. Touch internally

B. Touch externally

C. Intersect

D. None of these

Answer: B

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26. The equation of the sphere passing through the point (1,3,-2) and the circle $x^2 + y^2 + z^2 = 25$ & $x = 0$, is

A. $x^2 + y^2 + z^2 - 11x + 25 = 0$

B. $x^2 + y^2 + z^2 + 11x - 25 = 0$

C. $x^2 + y^2 + z^2 + 11x + 25 = 0$

D. None of the above

Answer: B

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27. The equation of the plane containing the line $\frac{x+1}{-3} = \frac{y-3}{2} = \frac{z+2}{1}$ and the point $(0, 7, -7)$ is

A. $x + y + z = 1$

B. $x + y + z = 2$

C. $x + y + z = 0$

D. None of these

Answer: C

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28. If the planes $x = cy + bz, y = az + cx$ & $z = bx + ay$, pass through one line then $a^2 + b^2 + c^2 + 2abc$, is equal to

A. ab

B. 1

C. bc

D. 0

Answer: B

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29. The point P is the intersectiono the straight line joining the ponts $Q(2, 3, 5)$ & $R(1, -1, 4)$ with the plane $5x - 4y - z = 1$ .If Sbe the foot of the perpendicular drawn from the point T(2,1,4) to QR then the length (in units) of the line segment PS is

A. $\frac{1}{\sqrt{2}}$

B. $\sqrt{2}$

C. 2

D. $2\sqrt{2}$

Answer: A

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30. In a three dimensional coordinate system, P,Q and R are images of a point A(a,b,c) in th xy,yz and the zx planes, respectively. If G is the centroid of ΔPQR, then the area of ΔAGO is (where o is the origin)

A. 0 sq.units

B. $a^2 + b^2 + c^2$ sq. units

C. $\frac{2}{3}\left(a^2 + b^2 + c^2\right)$ sq.units

D. None of these

Answer: A

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